REMARKS

Prior to discussing the May 29, 2003 office action, Applicants respectfully point out that Applicants filed an Information Disclosure Statement (pursuant to 37 C.F.R. §1.97(c)) on August 1, 2003. A copy of the Form PTO-1449 that was included with that Information Disclosure Statement is enclosed for the Examiner's benefit.

The Examiner is asked to contact Applicants if the Examiner has not yet received the complete August 1, 2003 Information Disclosure Statement.

Claims 1-20 are pending in the subject application, and stand rejected pursuant to both 35 U.S.C. §112, second paragraph and 35 U.S.C. §103(a). Also, the specification of the subject application is objected to based on the length of the abstract of the disclosure. Applicants submit that (a) the claim rejections are improper (and, therefore, should be withdrawn) in view of at least the remarks provided below, and that (b) the objection to the specification is overcome in view of the amendment set forth above.

Objection to the Specification

The specification of the application is objected to because the abstract of the disclosure "is more than 15 lines in length." As indicated above, Applicants have deleted the originally filed abstract of the disclosure and have inserted a new abstract of the disclosure that, by Applicants' calculation, is 12 lines in length and includes fewer than 150 words.

In view of the new abstract of the disclosure, Applicants respectfully request that the pending objection to the specification be withdrawn.

The 35 U.S.C. §112 Rejections

Applicants traverse this rejection and submit that (a) claims 1-20 satisfy the requirements of 35 U.S.C. §112 and (b) that claims 1-20 do not, despite the Examiner's contention to the contrary, require clarification.

To answer the Examiner's specific question (i.e., "is the character/function of the polymer blend changed because A1 is polymerized earlier than A2 is?") at Paragraph #5 of the May 29, 2003 office action, Applicants submit that several benefits are gained by first polymerizing component (A1) and thereafter polymerizing component (A2) – that is, by conducting a two-step polymerization. As indicated in the "Background of the Invention" section of the subject application (see, in particular, page 3, lines 4-20), it has been noted that continuous polymerization of a propylene resin and an ethylene α-olefin copolymer rubber results in an elastomer composition that has several "not fully satisfactory" characteristics (e.g., flexibility/rigidity, low-temperature impact resistance, surface gloss, releasing property). In stark contrast, and as is described throughout the specification of the subject application, an air bag housing cover that is comprised of an olefin-based thermoplastic elastomer that has been produced by first polymerizing component (A1) and thereafter polymerizing component (A2) - that is, by conducting a two-step polymerization – exhibits excellent mechanical properties and characteristics.

In view of at least the remarks above and the data contained within the TABLE below, Applicants respectfully request that the pending rejection of claims 1-20 pursuant 35 U.S.C. §112 be withdrawn.

The 35 U.S.C. §103(a) Rejections

Claims 1-6, 8-14, 17 and 19 are rejected in view of U.S. Patent No. 6,372,847 to Wouters ("the Wouters patent"), and claims 7, 15 and 16 are rejected in view of the Wouters patent and in further view of U.S. Patent No. 6,045,152 to Oda ("the Oda patent"), and claims 18 and 20 are rejected in view of the Wouters patent and in further view of U.S. Patent No. 6,210,797 to Sato et al. ("the Sato patent"). Applicants respectfully traverse these rejections and submit that claims 1-20 patentable over the Examiner's proposed combinations of the cited references.

Claims 1-20 recite various embodiments of the Applicants' air bag housing cover, which, as described in the subject application and as recited in claims 1-20, is comprised of an olefin-based thermoplastic elastomer. Due to its composition and two-step polymerization, the claimed air bag housing cover exhibits excellent mechanical properties (e.g., flexibility, low-temperature impact resistance), is low in surface gloss, and demonstrates excellent releasing property and dimensional stability. Due further to its unique and advantageous composition and two-step polymerization, the air bag housing cover of claims 1-20, upon deployment, will be perfectly opened at its expected tear line without any broken pieces and with reduced (as compared to conventional air bag housing covers) sharpness of the opened, broken edge of the air bag housing cover.

According to claims 1-20, the composition of an air bag housing cover comprises (A) an olefin-based thermoplastic elastomer, which itself comprises (A1) a propylene homopolymer having an isotactic index of not less than 90%, and (A2) a copolymer of propylene and a C_2 to C_8 α-olefin other than propylene. The propylene homopolymer (A1) and the copolymer (A2) are present within the elastomer (A) in amounts of 30 to 60% by weight and 70 to 40% by weight, respectively, based on the total amount of the components (A1) and (A2), wherein the copolymer has propylene unit and ethylene unit as essential constituting units. The olefin-based thermoplastic elastomer (A) is obtained by two-step polymerization (i.e., by first producing the component (A1) by polymerization and then subsequently producing the component (A2) by polymerization in the presence of the component (A1)), and has a 0°C eluate content of 30 to 60% by weight based on a total eluate content as measured at a temperature between 0°C and 140°C by a temperature rising elution fractionation using o-dichlorobenzene as a solvent.

Temperature rising elution fractionation TREF is an index of the composition distribution of the polymer, especially of the distribution of high crystalline, medium crystalline, low crystalline and non-crystalline components. Therefore, the feature "0°C eluate content of 30 to 60% by weight based on a total eluate content as measured at a temperature between 0°C and 140°C" that is recited in claims 1-20 indicates that (a) the content/fraction of the elastomer component that is not crystallized and solved in dichlorobenzene is equal to 30 to 60% by weight, and that (b) the elastomer component includes a relatively large amount of non-crystalline components.

As has been observed in accordance with the claimed invention, and as is indicated between page 10, line 16 and page 11, line 3 of the subject application, when the eluate obtained at 0°C is *less than* the claimed 30-60 weight percentage range, (a) it may be difficult for an air bag housing cover comprised of the olefin-based thermoplastic elastomer to exhibit low surface gloss, and (b) the air bag housing cover can demonstrate a poor balance between mechanical properties (e.g., a poor balance between flexibility and low-temperature impact resistance). Also, poor balance between mechanical properties (e.g., between flexibility and tensile strength), poor moldability, rigidity and releasing property are demonstrated when the eluate obtained at 0°C is *above* than the claimed 30-60 weight percentage range.

The benefits of an olefin-based thermoplastic elastomer wherein the eluate obtained at 0°C falls within the claimed 30-60 weight percentage range are further demonstrated by the data contained within the following TABLE, which reproduces data relating to "Example 1" from Table 1 of the subject application (see page 38) and data relating to "Comparative Example 1" and "Comparative Example 2" from Table 4 of the subject application (see page 41).

TABLE

		Ex. 1	Comp. Ex. 1	Comp. Ex. 2
Compositions (parts)				
(A)	Olefin-based thermoplastic elastomer obtained by two step polymerization			
	A-1 (0°C eluate content: **40** wt%)	100	-	-
	A-3 (0°C eluate content: **25** wt%)	-	100	-
(B)	Propylene-ethylene copolymer	-	-	45
(D)	Ethylene-α-olefin copolymer	-	-	55
Physical properties				
Izod impact strength (kJ/m²)		Not Broken	5	Not Broken
Air bag housing cover				
Releasing property		Good	Good	Not Good
Surface gloss (%)		24	50	80
Inflatability and Developability at -35°C		Good	Not Good	Good
Inflatability and Developability at -80°C		Good	Good	Good

The data in the above TABLE clearly demonstrates that various problems occur when the eluate obtained at 0°C falls outside of the 30-60 weight percentage range that is recited in claims 1-20. For example, in Comparative Example 1, an olefin-based thermoplastic elastomer was obtained by a two step polymerization process (as recited in claims 1-20), *but* the 0°C eluate content of the Comparative Example 2 elastomer was thereof was 5 wt% below the low end (i.e., 30wt%) of the claimed 30-60 weight percentage range. The Example 1 elastomer was identical to the Comparative Example 1 elastomer, except that its 0°C eluate content (i.e., 40wt%) fell within the claimed 30-60 weight percentage range.

Despite this being the only difference between the Example 1 olefin-based thermoplastic elastomer and the Comparative Example 1 olefin-based thermoplastic elastomer, the data in the TABLE above indicates that for the Comparative Example 1 olefin-based thermoplastic elastomer, its Izod impact strength was poor, and its inflatability and developability at -35°C was not good, whereas the Example 1 elastomer was not broken during the Izod impact strength test, and its inflatability and developability at -35°C was good.

Thus, the data in the TABLE indicates that for an air bag housing cover that is comprised of an olefin-based thermoplastic elastomer, it is desirable for the eluate obtained at 0°C to fall within 30-60% by weight.

The data in the TABLE further confirms that for an air bag housing cover that is made of an olefin-based thermoplastic elastomer, it is desirable for the elastomer to be formed via two-step polymerization. For example, according to the TABLE the releasing property for the Example 1 elastomer, which *was* formed via two-step polymerization, was good, whereas the releasing property for the Comparative Example 2 elastomer, which was formed by blending propylene-ethylene copolymer and ethylene-α-olefin copolymer (i.e., which *was not* formed via a two-step polymerization) was not good.

In sum, the data in the TABLE demonstrates that, for an air bag housing cover that is comprised of an olefin-based thermoplastic elastomer, it is desirable (a) for the eluate obtained at 0°C to fall within 30-60% by weight and (b) for the elastomer to be formed via a two-step polymerization.

Turning now to a discussion of the references cited by the Examiner to support the current rejections pursuant to 35 U.S.C. §103(a), the Wouters patent discloses a polymer composition comprising a) a first polymer of propylene and optionally one or more comonomers selected from ethylene and C_3 to C_{20} α-olefins, said polymer having a melting point of 110°C or more derived from propylene crystallinity; and b) a second polymer comprising ethylene and one or more C_3 to C_{20} α-olefins, said second polymer having a MLRA/ML ratio of 8 or more and an ethylene content of from about 74 to about 95 mole percent.

According to the Wouters patent, the first polymer of the polymer composition is a propylene based polymer, the second polymer is an ethylene based polymer, and the polyolefin composition is essentially a polymer blend, e.g., a thermoplastic olefin elastomer blend (TPO blend). At column 4, lines 35-38 of the Wouters patent, there is a description that "Such propylene-based polymers include, but are not limited to, isotactic polypropylene homopolymer, syndiotactic polypropylene homopolymer, sequentially made reactor copolymers, often called reactor copolymers...." Thus, the first polymer component of the polymer compositions described in the Wouters patent is not limited to a specific polypropylene.

Moreover, in the Wouters patent, there does not appear to be any description or suggestion of 0°C eluate content of 30 to 60% by weight measured by the TREF method (as recited in claims 1-20 of the subject application) - that is, there is no disclosure of the composition distribution of the polymer, nor of the distribution of high crystalline, medium crystalline, low crystalline and non-crystalline components.

Additionally, the Wouters patent does not appear to describe or suggest that its polyolefin compositions would provide the numerous beneficial mechanical properties (e.g., flexibility, low-temperature impact resistance, low surface gloss, excellent releasing property, and excellent dimensional stability) that are important when using such a material in an air bag housing cover setting and that are provided when using the olefin-based thermoplastic elastomer of claims 1-20 as an air bag housing cover.

Thus, Wouters does not appear to disclose, or to contemplate an olefin-based thermoplastic elastomer obtained by two-step polymerization which has the 0°C eluate content of 30 to 60% by weight as measured by the TREF method.

Yet the Examiner states, on page 4 of the current office action, that "[t]he selection of (co)polymers having suitable properties and their use in suitable amounts is deemed a matter of optimization and determinable by routine experimentation." Applicants respectfully disagree.

As described in the subject application, numerous mechanical benefits (e.g., flexibility, low-temperature impact resistance, low surface gloss, and excellent releasing property) can unexpectedly be experienced when an air bag housing cover is formed of the olefin-based thermoplastic elastomer of claims 1-20. And as shown in the TABLE above, several of these benefits appear to be absent when an olefin-based thermoplastic elastomer either falls outside of the claimed range for 0°C eluate content, and/or when the elastomer is not prepared via the claimed two-step polymerization process.

Regarding the Oda patent, it teaches an air-bag cover that is formed of a thermoplastic elastomer composition of (a) 5-50% by weight of a hydrogenated block copolymer, (b) 20-60% by weight of a copolymer of propylene and an α-olefin, (c) 5-50% by weight of a paraffinic oil, (d) 5-70% by weight of an ethylene-α-olefin copolymer rubber and/or (e) a thermoplastic elastomer, and (f) 0.1-10% by weight of a silicone.

Regarding the Sato patent, it describes a casing for storing an airbag for an airbag restraint system whose main body is formed of a material comprising a thermoplastic elastomer composition which is prepared by: mixing 100 parts by weight of a copolymer composition with 0.05 to 0.5 parts by weight of a lubricant comprising higher fatty acid amide.

As with the Wouters patent, neither the Oda patent nor Sato patent describes or suggests forming an air bag housing from an olefin-based thermoplastic elastomer that (a) was obtained by two step polymerization and that (b) exhibits a 0°C eluate content of 30 to 60% by weight as measured by the TREF method, nor is there any description or suggestion that an air bag housing cover formed of the materials described in Oda patent and/or the Sato patent would exhibit the excellent mechanical properties (e.g., flexibility, low-temperature impact resistance, low surface gloss, excellent in releasing property, excellent dimensional stability) that are exhibited by an air bag housing cover formed of the olefin-based thermoplastic elastomer recited in claims 1-20.

Therefore, neither the Wouters patent, nor the Oda patent, nor the Sato patent (nor any combination of two or more of these references) discloses or suggests the olefin-based thermoplastic elastomer material from which the air bag housing cover of claims 1-20 is comprised.

Moreover, as indicated in the TABLE above, and as further indicated throughout the specification and Tables 1-4 of the subject application, and contrary to the Examiner's contention at page 4 of the current office action, one of ordinary skill in the art - even if familiar with the contents of the cited references – would not have arrived upon - via "routine experimentation" - the highly beneficial features of the claimed olefin-based thermoplastic elastomer.

In view of at least the remarks provided above, claims 1-20 of the subject application are believed to meet the requirements of 35 U.S.C. §112, and are believed to be patentable over the cited references. Thus, reconsideration and allowance of claims 1-20 are respectfully requested. If the undersigned can be of any assistance in advancing the prosecution of this case, the Examiner is invited to contact him using the information provided below.

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Respectfully submitted,

By: _____

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